Extended Abstract

MRONJ Treatment with Ultrasonic Navigation: A Case Report [†]

**Salvatore Emanuele Teresi *, Gerardo Pellegrino, Roberto Parrulli, Agnese Ferri,
Francesca Pavanelli, Riccardo Pirrotta and Claudio Marchetti**

Unit of Oral and Maxillofacial Surgery, Department of Biomedical and Neuromotor Science (DIBINEM),
University of Bologna, 40125 Bologna, Italy; gerardo.pellegrino2@unibo.it (G.P.);
roberto.parrulli@studio.unibo.it (R.P.); agnese.ferri@studio.unibo.it (A.F.);
francesca.pavanelli2@unibo.it (F.P.); riccardo.pirrotta@studio.unibo.it (R.P.);
claudio.marchetti@unibo.it (C.M.)

* Correspondence: salvatore.teresi@studio.unibo.it; Tel.: +39-3209118860

[†] Presented at the XV National and III International Congress of the Italian Society of Oral Pathology and
Medicine (SIPMO), Bari, Italy, 17–19 October 2019.

Published: 12 December 2019

Nowadays dynamic computer-based image navigation has become ordinary for hospital-based surgical specialties such as neurosurgery, otolaryngology and maxillofacial-surgery, its use for osteonecrosis curettage is considered “off-label” and isn’t reported in literature. The surgical navigator is a technological-tool which relate the real anatomy of a patient to his radiological images, showing the exact three-dimensional intraoperative position of surgical-instruments. In particular, ImplaNav (BresMedical, Sydney, Australia) is composed of an infrared-camera and reference systems that are placed on the patient and on surgical-handpiece, whose position is detected in real-time by camera.

In this report we expose the innovative use of navigated ultrasonic surgery in the treatment of a bilateral medication-related osteonecrosis of the jaw (MRONJ) stage 2b [1] involving the right mandibular canal’s roof in molar region, which is why the patient reported paresthesia to lower right lip, and incurred following the lower first molars’ extraction in a 75-year-old male patient, subjected to 43 previous administrations of Zoledronate (from January 2014 to June 2017) for the treatment of bone metastases from stage IV follicular-thyroid carcinoma.

In order to operate with navigator’s aid, the patient’s pre-operative cone-beam computed-tomography (CBCT) was performed by positioning a reference system on dental arches, fixed with an impression material, according to ImplaNav protocol [2].

The surgery was conducted as in-office procedure (Figures 1 and 2) under local anesthesia, after antibiotic-prophylaxis with Amoxicillin + Clavulanic-Acid 1 g/8 h and Metronidazole 250 mg/8 h, both from 3 days before the operation. The preparation of the buccal and lingual flaps and their subsequent suturing have been performed in order to ensure an optimal vision and primary wound closure.

Compared to the traditional multi-blade burr mounted on a straight-handpiece, the well-known atraumaticity of ultrasonic-surgery allowed the respect of nerve-vascular bundle and a reduced trauma on the bone. The navigation added, to the simultaneously clinical finding of bleeding bone, the possibility of a constant comparison between clinical vision and CBCT monitor vision, allowing a rapid and complete removal of the radiographically detected altered bone.

Figure 1. The reference systems placed on the patient and on the surgical-handpiece are detected by the infrared-camera. In this way, the monitor can show in real-time to the surgeon the exact three-dimensional position of the surgical-instruments compared to the preoperative-CBCT.

Figure 2. The intraoperative screenshot of the monitor shows the position of the ultrasonic tip compared to the preoperative-CBCT. The screenshot emphasizes how the surgeon, with the aid of the ultrasonic navigation system, can operate safely and accurately working in close proximity to the vascular-nerve bundle involved in the osteonecrosis.

The patient continued the antibiotic therapy according to aforementioned posology for another 7 days and, to date, has undergone checks at 1, 2, 4 and 12 weeks. During these visits a healing by first intention was appreciated in the absence of signs and symptoms of inflammation, however, paraesthesia remains, even if, as reported by the patient, in improvement.

The navigated ultrasonic surgery, respect to conventional free-hand surgery, has reduced the timing of surgery and tissue injury and increased the accuracy, mini-invasiveness and safety,

maximizing the control of surgical-instruments and respecting the noble structures. The positive outcome of this first case of MRONJ, managed with navigated ultrasonic surgery, suggests the possibility of using this method in further cases in order to confirm the aforementioned advantages and standardize the technique.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Bedogni, A.; Campisi, G.; Agrillo, A.; Fusco, V. *Expert Commission SICMF-SIPMO: Raccomandazioni Clinico-Terapeutiche Sull'osteonecrosi delle ossa Mascellari Associata a Farmaci Bisfosfonati e sua Prevenzione*; version 1.1; CLEUP: Padova, Italy, 2013.
2. Pellegrino, G.; Taraschi, V.; Vercellotti, T.; Ben-Nissan, B.; Marchetti, C. Three-Dimensional Implant Positioning with a Piezosurgery Implant Site Preparation Technique and an Intraoral Surgical Navigation System: Case Report. *Int. J. Oral Maxillofac. Implants* **2017**, *32*, e163–e165, doi:10.11607/jomi.5800.

© 2019 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).